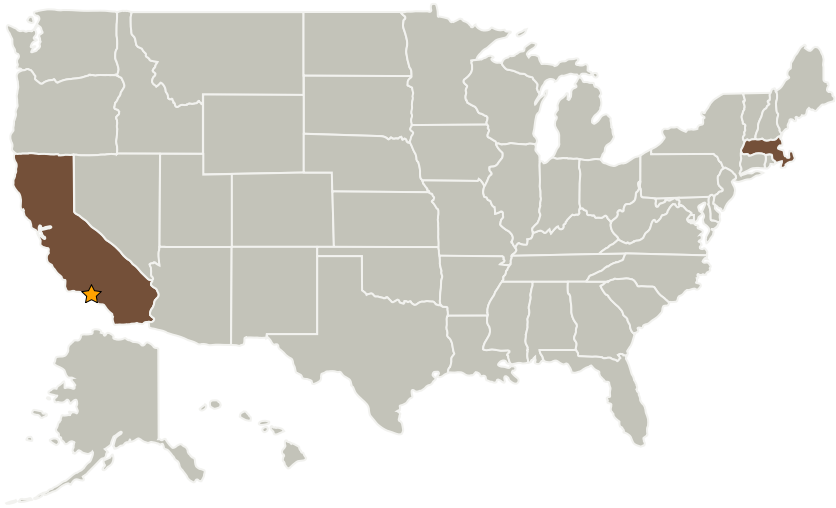
Integrated MMIC for Phase-Locked Oscillators and Frequency Synthesizers, Phase I

Completed Technology Project (2007 - 2007)

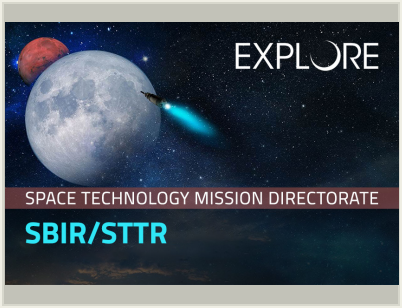
Project Introduction

Microwave Monolithic Integrated Circuits (MMIC) provide the technology base for miniaturization of microwave payloads in spacecraft. While MMIC chips are widely available for amplifiers, switches, converters, etc., there is only a limited supplier base for MMIC signal sources. Hittite has recognized the need and introduced a family of MMICs for phase-locking loops and phase-locked oscillators. Hittite's MMICs include; VCOs, frequency multipliers and dividers, programmable counters, phase-frequency detectors, and loop amplifiers. This proposal describes and approach of integrating many of those MMIC parts into a single chip for frequency synthesis without VCOs. This choice of the scale of integration will support the design architecture for frequency synthesizers with versatility of a wide range of operating frequencies. The selected design goals will allow signal generation from 100 MHz to 12 GHz. The phase noise floor of the synthesizer is expected to be -150 dBC/Hz at 100 MHz offset. Design approaches for all component parts of the proposed MMIC are presented.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Hittite Microwave Corporation	Supporting Organization	Industry	Chelmsford, Massachusetts



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations	
California	Massachusetts

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.2 Radio Frequency
    - TX05.2.7 Innovative RF Technologies